

FORM PTO-1396 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

70301/56223

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/914256

INTERNATIONAL APPLICATION NO.

PCT/EP00/11717

INTERNATIONAL FILING DATE

November 24, 2000

PRIORITY DATE CLAIMED

December 24, 1999

TITLE OF INVENTION

FOOT PROSTHESIS

APPLICANT(S) FOR DO/EO/US

Lutz BIEDERMANN and Urs SCHNEIDER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
- ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
- ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
- ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
- ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
- ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

PCT/RO/101**PCT/IB/304**

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/914256

INTERNATIONAL APPLICATION NO.

PCT/EP00/11717

ATTORNEY'S DOCKET NUMBER

70301/56223

24. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

- ☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00
- ☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00
- ☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00
- ☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$860.00

Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). ☐ 20 ☐ 30

\$0.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	10 - 20 =	0	x \$18.00	\$0.00
Independent claims	1 - 3 =	0	x \$80.00	\$0.00

Multiple Dependent Claims (check if applicable) ☐

\$0.00

TOTAL OF ABOVE CALCULATIONS =

\$860.00

☒ Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.

\$430.00

SUBTOTAL =

\$430.00

Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). ☐ 20 ☐ 30 +

\$0.00

TOTAL NATIONAL FEE =

\$430.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☒

\$40.00

TOTAL FEES ENCLOSED =

\$470.00

Amount to be:

refunded \$

charged \$

a. ☒ A check in the amount of \$470.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-1105 A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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George W. Neuner

NAME

26,964

REGISTRATION NUMBER

DATE

Attorney Docket No. 70301/56,223

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Lutz Biedermann, et al.

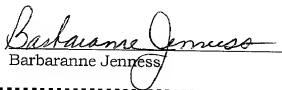
National stage of PCT/EP00/11717

FILED: Herewith

FOR: FOOT PROSTHESIS

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service, in an envelope as "Express Mail Post Office Addressee" Mailing Label Number EL895418750US addressed to BOX DO/EO/US, Commissioner of Patents and Trademarks, Washington, D.C. 20231 on August 22, 2001.


Barbaranne Jenness

Box DO/EO/US
Commissioner for Patents
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Please amend the subject application as follows and before calculating the filing fee therefor.

IN THE CLAIMS:

Please cancel claims 1-8 and insert the following **new** claims.

9. A foot prosthesis comprising:

a first spring element extending from a toe region to a lower leg region;

a second spring element extending from a heel region to said lower leg region;
said spring elements being connected to each other at said lower region; and
a tension element having two ends, which is connected with its one end to a forward region of the first spring element and connected with its other end at said heel region of the second spring element.

10. The foot prosthesis as claimed in claim 9, wherein the first and second spring elements are each a leaf spring having a ground-side surface, the springs being arranged and structured to rest against each other with their ground-side surfaces facing each other.

11. The foot prosthesis as claimed in claim 10, wherein said tension element is firmly connected to the ground-side surface of the forward region of the first spring element and of the heel region of the second spring element.

12. The foot prosthesis as claimed in claim 10, wherein said tension element is fixed at the forward end of said first spring element on an upper side thereof such, said first spring element having a slit-like opening in said forward region through which said tension element is fed toward said second spring element.

13. The foot prosthesis as claimed in claim 9, further comprising an adapter that connects the spring elements at the lower leg region for connection to a lower leg portion.

14. The foot prosthesis as claimed in claim 9, wherein said tension element is a ribbon-like element.

15. The foot prosthesis as claimed in claim 9, wherein said tension element is firmly connected to a ground side of each of said spring elements.

16. The foot prosthesis as claimed in claim 9, wherein said tension element is fixed at the forward end of said first spring element on an upper side thereof such, said first spring element having a slit-like opening in said forward region through which said tension element is fed toward said second spring element.

17. The foot prosthesis as claimed in claim 9, wherein said first and second spring elements are formed as a concave shape when viewed from the top.

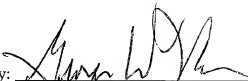
18. The foot prosthesis as claimed in claim 9, wherein said first and second spring elements comprise a carbon fiber composite material and said tension element comprises a stretch-free material.

REMARKS

Early and favorable action is requested.

Respectfully submitted,

Date: 21 Aug '01

By: 
George W. Neuner
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BOS2_172288.1

09/914256
518 Rec'd PCT/PTO 22 AUG 2001PCT/EP00/11717
BIEDERMANN MOTECH GmbH

2/p1s

Foot prosthesis

The invention relates to a foot prosthesis. From the brochure BIEDERMANN MOTECH, Unterschenkel-Systeme (lower leg systems), page 15, a foot prosthesis is known which is formed by a first spring element and a second spring element connected thereto. The first spring element extends from the toe region to the lower leg region and is formed in a convex fashion as viewed from the top. In the lower leg region the free end supports an adapter for connecting to the lower leg element of a prosthesis. In the region around the ball of the foot the spring element is firmly connected on its lower side to the upper side of the front foot side end of a second spring element by means of screws, which second spring element extends with its free end to the toe region. The first spring element consists of a carbon fiber composite material and has the appearance of a leaf spring having a width of about 4 cm in the ball region and a thickness of 3 to 4 mm.

It is an object of the invention to provide a foot prosthesis with even better gait characteristics.

This object is achieved by a foot prosthesis according to claim 1.

Further embodiments of the invention are characterized in the dependent claims.

Further features and advantages of the invention will be apparent from the description of embodiments with respect to the figures, where

- Fig. 1 is a lateral view of a first embodiment of the invention;
- Fig. 2 is a corresponding lateral view of a second embodiment;
- Fig. 3 is an illustration similar to the one in Fig. 2;
- Fig. 4 is a plan view of the object shown in Fig. 3 in the direction of arrows A'-A; and
- Fig. 5 shows the object shown in Fig. 1 in an artificial foot represented in section.

The first embodiment shown in Fig. 1 comprises a first spring element 1 and a second spring element 2. Each of the spring elements is formed in a concave fashion as viewed from the top. The first spring element 1 extends with one free end 3 from the toe region to its opposite free end 4 which is held in an adapter 5 that can be connected to the lower leg portion of a prosthesis. The second spring element 2 extends with one of its free ends 6 from the heel to its other free end 7 which is held in the adapter 5.

The bending of the two spring elements is selected such that in their inoperative position the two ground-side free ends 3, 6 are supported flat on the ground and the opposite free ends 4, 7 abut in parallel fashion with their convex-side surface, as can be seen in the figure, and are held in a slot 7' of the adapter 5 and are fixed in the adapter 5 by a locking screw 8.

As can be seen from the figures, the front foot region of the first spring element 1 and the heel region of the second spring element 2 are connected to each other through a tension element 9. As can be best seen in Fig. 4, the tension element is formed in a ribbon-like manner and is formed as a stretch-free tension ribbon. The tension element 9 is connected in a tension-proof fashion with one of its ends as close as possible to the free end 6 of the second spring element 2 using rivets 10 and with its other free end close to the free end of the first spring element 1 using rivets 11. The connection location of the

rivets 11 is selected such that the first spring element 1 in its normal position is still located a distance from the ground. This provides the advantage that during the walking the tension element 9 does not always rest on the ground and will thus be spared. The connecting location with the rivets 11 should be as close as possible to the free end 3 of the first spring element.

The foot prosthesis formed in this manner provides for especially advantageous gait characteristics starting by setting the foot in its heel region on the ground and finishing with a rolling movement through the front foot.

The embodiment shown in Fig. 2 coincides with respect to the shape of the spring elements, the connection to the adapter and the provision of a tension element.

In order to achieve the advantage that the tension element 9' is fixed as close as possible to the free ends 3, 6 using the rivets 10, 11 and that the tension element acts on the outermost free ends on the one hand, and the advantage that the tension element does not completely rest on the ground on the other hand, there is provided, a distance from the free end 3 where the first spring element 1 has just enough clearance from the ground, a slit 12 extending along a direction transverse to the longitudinal direction of the first spring element 1', as can be best seen in Fig. 4. This slit is designed to lead the tension element 9' across the slit 12 all the way to the forward free end 3 of the first spring element 1'. Starting from the slit 12, the tension element 9' is arranged in closely fitting relationship with the convex portion of the spring element 1' and is firmly connected thereto in the toe region by rivets 11, as is best seen in Fig. 2.

Alternatively, it is also possible to arrange the tension element 9 at the bottom surface of the first spring element 1

and all the way to the free end, if it is accepted that the tension element will then rest on the ground.

Referring to Fig. 5, the embodiment described first is introduced into an artificial foot 13 in a basically known fashion.

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Claims

1. A foot prosthesis comprising a first spring element (1) extending from a toe region to a lower leg region; a second spring element (2) extending from a heel region to said lower leg region; said spring elements (1, 2) being connected to each other by their lower leg side first ends (4, 7); and a tension element (9, 9') connected to the forward region of the foot (3) with its one end and connected to said heel region (6) of the spring elements (1, 2) with its other end.

2. The foot prosthesis as claimed in claim 1, characterized in that the two spring elements (1, 2) are formed as leaf springs resting against each other with their ground-side surfaces at their connecting point.

3. The foot prosthesis as claimed in claims 1 or 2, characterized in that the connected ends (6, 7) are connected by an adapter (5) for connecting to a lower leg portion.

4. The foot prosthesis as claimed in any one of claims 1 to 3, characterized in that said tension element (9, 9') is formed in a ribbon-like fashion.

5. The foot prosthesis as claimed in any one of claims 1 to 4, characterized in that said tension element (9, 9') is firmly connected at the ground-side with each of its ends to said spring elements (1, 2).

6. The foot prosthesis as claimed in any one of claims 1 to 4, characterized in that said tension element (9, 9') is fixed at the forward end of said first spring element (1) at the upper side thereof such that a slit-like recess (12) provided a distance from said forward end in said spring element is fed toward said second spring element (2).

7. The foot prosthesis as claimed in any one of claims 1 to 6, characterized in that said spring elements (1, 2) are formed as a convex shape when viewed from the top.

8. The foot prosthesis as claimed in any one of claims 1 to 7, characterized in that said spring elements (1, 2) are made of a carbon fiber composite material and said tension element (9, 9') is made of a stretch-free material.

Abstract

There is provided a foot prosthesis having especially good gait characteristics. To that end, the prosthesis comprises a first spring element 1 extending from the toe region to the lower leg region and a second spring element 2 extending from the heel region to the lower leg region. The spring elements are formed as leaf-type elements and are connected to each other by their lower leg side first ends 4, 7. There is provided a tension element 9 which is connected in the forward region of the foot with its one end and connected in the heel region 6 to the second spring element.

(Fig. 1)

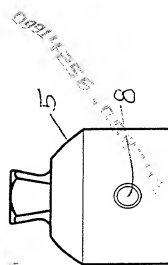


Fig. 3

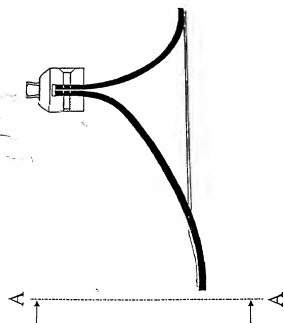


Fig. 4

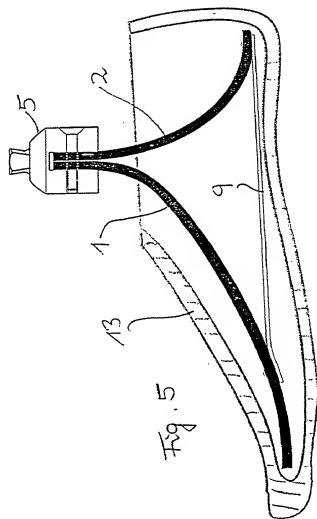
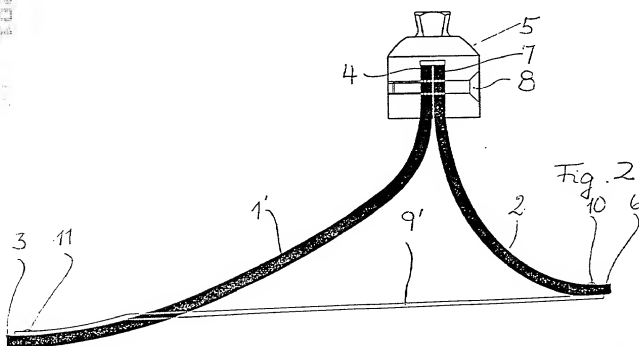
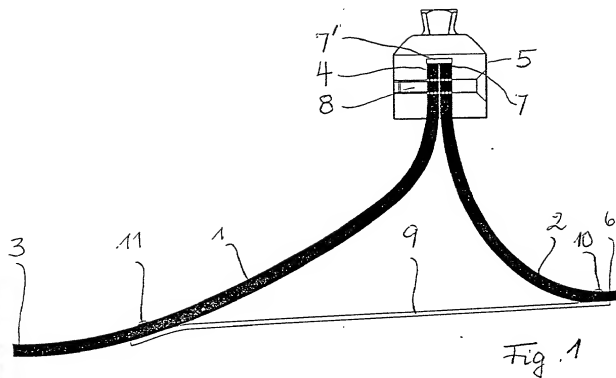


Fig. 5

A-A

(1/2)



DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed at 201) below or an original, first and joint inventor (if plural names are listed at 201-206 below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **FOOT PROSTHESIS**

which is described and claimed in:

- ☒ the specification attached hereto.
- ☐ the specification in U.S. Application Serial Number _____, filed on _____.
- ☐ the specification in PCT international application Number, _____, filed on _____; and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign/PCT Applications and Any Priority Claims Under 35 U.S.C. §119:

Application No.	Filing Date	Country	Priority Claimed Under 35 U.S.C. §119?
199 62 851.3	December 24, 1999	Germany	<input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose material information as defined in 37 CFR §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Prior U.S. Applications or PCT International Applications Designating the U.S.-Benefit Under 35 U.S.C. §120					
U.S. Applications		Status (Check One)			
Application Serial No.	U.S. Filing Date	Patented	Pending	Abandoned	
PCT Applications Designating the U.S.					
Application No.	Filing Date	U.S. Serial No. Assigned			
PCT/EP00/11717	November 24, 2000				

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)
(35 U.S.C. §119(e))

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

Applicant	Provisional Application Number	Filing Date

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) with full powers of association, substitution and revocation to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Sewall P. Bronstein (Reg. No. 16,919)
 David G. Conlin (Reg. No. 27,026)
 George W. Neuner (Reg. No. 26,964)
 Linda M. Buckley (Reg. No. 31,003)

Peter F. Corless (Reg. No. 23,860)
 Peter J. Manus (Reg. No. 26,766)
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 William J. Daley, Jr. (Reg. No. 35,487)

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 Jennifer Holmes
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(Reg. No. 40,927)
 (Reg. No. 38,256)
 (Reg. No. 44,368)
 (Reg. No. 27,840)
 (Reg. No. 32,639)
 (Reg. No. P-46,778)
 (Reg. No. P-47,060)

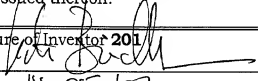
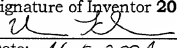
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Boston, Massachusetts 02109

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 George W. Neuner
 (617) 523-3400

201	FULL NAME OF INVENTOR	LAST NAME BIEDERMANN	FIRST NAME <u>Lutz</u>	MIDDLE NAME
	RESIDENCE & CITIZENSHIP	CITY 78048 VS-Villingen	STATE OR FOREIGN COUNTRY Germany DEX	COUNTRY OF CITIZENSHIP Germany
	POST OFFICE ADDRESS	POST OFFICE ADDRESS Am Schäfersteig 8	CITY 78048 VS-Villingen	STATE OR COUNTRY AND ZIP CODE Germany/78048
202	FULL NAME OF INVENTOR	LAST NAME SCHNEIDER	FIRST NAME <u>Urs</u>	MIDDLE NAME
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	POST OFFICE ADDRESS	POST OFFICE ADDRESS Mohlstrasse 60	CITY 72074 Tübingen	STATE OR COUNTRY AND ZIP CODE Germany/72074
203	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY AND ZIP CODE
204	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY AND ZIP CODE
205	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY AND ZIP CODE
206	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY AND ZIP CODE

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature of Inventor 201 	Signature of Inventor 202 
Date: 14.05.107	Date: 16.5.2001
Signature of Inventor 203	Signature of Inventor 204
Date:	Date:
Signature of Inventor 205	Signature of Inventor 206
Date:	Date: